

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of:)	
)	
Authorizing Permissive Use of the “Next)	GN Docket No. 16-142
Generation” Broadcast Television Standard)	

**COMMENTS OF
NCTA – THE INTERNET & TELEVISION ASSOCIATION**

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NCTA – The Internet & Television Association (“NCTA”)¹ submits these comments in the above-captioned rulemaking proceeding. The *Notice of Proposed Rulemaking* (“Notice”)² proposes to allow television stations to use a new transmission standard (“ATSC 3.0”) on a voluntary basis.

INTRODUCTION AND SUMMARY

Just last month, the Commission announced the results of its spectrum auction and issued a repacking plan for the broadcast band that will require nearly one thousand television stations to relocate to a different channel. More than one hundred stations that relinquished their spectrum in the auction may reemerge as “channel sharing” stations that will be using a portion of another station’s 6 MHz channel to transmit from a new location. These changes will require significant coordination between the broadcast and cable industries to protect the viewing public from disruption. In addition, ATSC participants are still defining recommended practices for the conversion and redistribution of ATSC 3.0 services.

¹ NCTA is the principal trade association for the U.S. cable industry, representing cable operators serving 85 percent of the nation’s cable television households and more than 200 cable program networks. The cable industry is the nation’s largest provider of broadband service after investing more than \$250 billion over the last two decades to build two-way interactive networks with fiber optic technology. Cable companies also provide state-of-the-art competitive voice service to more than 30 million customers.

² See *In re Authorizing Permissive Use of the “Next Generation” Broadcast Television Standard*, Notice of Proposed Rulemaking, 32 FCC Rcd 1670 (2017) (“Notice”).

Allowing stations to opt to transmit an additional signal using this new transmission standard – ATSC 3.0 – threatens to compound disruption in the industry and to the public. The technical characteristics of this new standard dictate that an ATSC 3.0 signal cannot be transmitted in the same 6 MHz channel as a station’s existing signal (ATSC 1.0). Therefore, a broadcaster choosing to transmit this new signal from its licensed facility will need to find a different home for its existing ATSC 1.0 signal on a separate station willing to “host” that simulcast stream in the host station’s 6 MHz channel. Approving this new standard, therefore, could lead to yet another round of channel sharing and station moves by the signals that cable operators have been carrying for years.

The instability in the over-the-air broadcasting landscape will impact the cable industry, through which tens of millions of viewers receive their television signals. The ATSC 3.0 signal is currently incompatible with essentially every television set and every multichannel video programming distributor (“MVPD”) across the country. Absent appropriate Commission action, cable operators could be compelled to incur equipment and carriage costs for a signal that is of little, if any, interest to customers today. Other video and non-video services (such as broadband) could be squeezed as broadcasters demand access to scarce cable capacity for yet another signal.

Therefore, while NCTA does not object to the Commission authorizing broadcasters to experiment with this new transmission technology, that approval must be accompanied by measures to protect the public interest. As detailed herein, to avoid potential harms, the Commission must adopt rules to protect against broadcasters attempting to use ATSC 3.0 to impose costly burdens on cable operators and their customers.

First, the Commission must establish rules to maintain the *status quo* during this transition period. Broadcasters must adhere to their pledge to continue to deliver an ATSC 1.0 simulcast stream during the entire time that they are transmitting an ATSC 3.0 signal, until the Commission decides the transmission of ATSC 1.0 simulcasts should end.

Second, the Commission must protect against broadcasters degrading their ATSC 1.0 simulcast stream during this period of dual transmissions. Broadcasters must continue to provide the identical content on both signals and in the same format and resolution on their ATSC 1.0 simulcast stream as they are currently.

Third, broadcasters must continue to serve the same community of license and coverage area with their over-the-air ATSC 1.0 simulcast stream, even if they opt to channel share on another station's ATSC 1.0 channel to make room for an ATSC 3.0 launch on their licensed facility. Otherwise, cable operators may lose access to a usable over-the-air signal.

Finally, the Commission must include protections to ensure that broadcasters do not use must-carry elections or retransmission consent negotiations to shift the significant costs and burdens of the ATSC 1.0 simulcast stream and ATSC 3.0 launch onto cable operators and their customers.

I. ATSC 3.0 IS INCOMPATIBLE WITH TODAY'S CABLE SYSTEMS AND CONSUMER EQUIPMENT

Past improvements to broadcasting have occurred in a manner that protects consumers against unnecessary and costly dislocations. For example, when broadcasters introduced color television, consumers' equipment continued to be able to receive those signals even though they could not receive the enhanced feature. Even when an authorized transmission standard was not backward compatible with existing equipment, such as when digital over-the-air television was introduced, the government provided a lengthy transition period during which many users

replaced their analog sets, and provided hundreds of millions of dollars in public subsidies to ensure that consumers' analog television sets were outfitted with converter boxes to make the digital signals viewable.

In that respect, ATSC 3.0 represents a significant break from the past, both in purpose and effect. The proposed transition is not being mandated by the government, nor does it benefit the public through auction of broadcast spectrum for other uses.

Not only is the use of the standard proposed to be purely *optional*, but it is *incompatible* with all existing ways of receiving television signals by design. In fact, ATSC had been working on a “backward-compatible suite of enhancements dubbed ‘ATSC 2.0’,”³ with modifications that would “enhance the existing ATSC TV system with Internet capability and caching capability for storing programs.”⁴ But it “chose to forgo backwards compatibility,” and instead proceeded to create, with ATSC 3.0, “an entirely new television broadcasting system, from the physical layer all the way through coding and applications. ATSC 3.0 changes everything.”⁵ Unlike the current digital television standard, “ATSC 3.0 is based on Internet Protocol technology. It is, in fact, the world’s first IP-based broadcast transmission platform.”⁶ The resulting transmission system thus does not work with the new digital television sets that customers have purchased, and continue to purchase, by the millions or with MVPD systems generally.

This growing reliance by consumers on television sets dependent on ATSC 1.0 systems, coupled with the addition of a parallel incompatible ATSC 3.0 transmission path, could have a

³ Rich Chernock, ATSC TG3, *ATSC 3.0: Where We Stand, Next-gen Standard May Leapfrog ATSC 2.0*, <http://atsc.org/newsletter/atsc-3-0-where-we-stand/#.WRHixFXytaQ> (last visited Apr. 21, 2017).

⁴ *Id.*

⁵ Rich Chernock, *Getting From Here to ATSC 3.0*, TV Technology (Feb. 8, 2017) <http://www.tvtechnology.com/atsc3/0031/getting-from-here-to-atsc-30/280299>.

⁶ Comments of the Advanced Television Systems Committee, Inc., GN Dkt. No. 16-142, at 3 (filed May 26, 2016).

substantial impact upon cable operators. Without an ATSC 1.0 simulcast stream, operators would need to modify their entire system operations to be able to transmit even one television station that might opt to experiment with the ATSC 3.0 standard. This incompatible standard differs from existing cable technology in every significant way – the physical layer, the transport layer, and the presentation layer.

The *physical layer* is the “core transmission system that is the basis for any over-the-air broadcast service. The physical layer is focused on modulation and coding, emission waveforms and other common system elements.”⁷ Cable systems generally use single carrier Quadrature Amplitude Modulation (QAM) for delivery of both broadcast and cable programming. Using QAM, cable has been efficiently transmitting ATSC 1.0 signals. In contrast, ATSC 3.0 will use a totally different modulation technique known as Orthogonal Frequency Division Multiplexing (OFDM) modulation,⁸ which is incompatible with equipment used by most QAM-based cable systems.

Not only does the modulation technique differ, the ATSC 3.0 data rates are not fixed at a single defined rate. A broadcaster can choose an “operating point” with higher data rate but lower coverage, or lower data rate and wider coverage. In contrast, programming delivered on cable systems, including ATSC 1.0 content, is delivered using a single stream with a single data rate. Moreover, ATSC 3.0 enables broadcasters to dynamically deliver the signal over-the-air in several “physical layer pipes” that may have differing robustness and data rates from one another. For example, they may choose to devote a portion of their bandwidth to Ultra High

⁷ ATSC, *TG3 Approves ATSC 3.0 Physical Layer Candidate Standard*, <http://atsc.org/newletter/atsc-3.0-where-we-stand#WPTNFfnytaQ> (last visited May 9, 2017).

⁸ Joint Petition for Rulemaking, filed by America’s Public Television Stations, AWARN Alliance, Consumer Technology Association and National Association of Broadcasters, at 11 (Apr. 13, 2016) (“Joint Petition for Rulemaking”).

Definition service and the rest to mobile service using higher robustness and lower data rates. Significantly, they can change the mix of bandwidth assigned to different services at different times during the day.⁹ The concept of “physical layer pipes” does not exist on cable systems and this type of variation is not supported by today’s cable systems.

The ATSC 3.0 *transport layer* – which connects the physical and presentation layers – also differs dramatically from existing operations. Cable systems – and broadcasters transmitting an ATSC 1.0 signal – use MPEG-2 transport based on packets of 188 bytes. MPEG content is delivered as streams, not files. ATSC 3.0 allows the use of two differing transport signaling systems: ROUTE/DASH and MMT. Both are based on IP packets of variable size and deliver content as files.

The ATSC 3.0 *presentation layer*, which represents essentially the elements that the viewer experiences, including video coding, audio coding, and the run-time environment,¹⁰ also fundamentally differs from today’s standard. In particular, cable uses MPEG-2 or AVC video coding, while ATSC 3.0 uses HEVC for video coding and cannot be decoded by existing cable set-top boxes. ATSC 3.0 allows delivery of video with Standard Dynamic Range, the Perceptual Quantization (PQ), and the Hybrid Log-Gamma (HLG) High Dynamic Range (HDR) systems and Wide Color Gamut (WGC), while ATSC 1.0 does not support any HDR or WCG capability. Moreover, while ATSC 1.0 delivers audio coded using AC-3, ATSC 3.0 delivers audio using either AC-4. or MPEG-H.¹¹

⁹ See *id.*

¹⁰ *Id.* at 12.

¹¹ The ATSC A/300 standard informs that broadcasters have selected AC-4 for use in North America.

The new approach to delivery of accessibility features also differs significantly. Closed captions are delivered today using the CTA 608/708 specification, embedded within the video stream. ATSC 3.0 delivers closed captioning as a file using IMSC1 specification.¹² Video description today consists of the program dialog and a narration describing the action, with those two audio components being combined before the program is broadcast. ATSC 3.0 does not have two distinct audio streams. Rather, those two audio components could be combined before broadcast, as today, or could be transmitted as separate components and combined in the TV receiver.

What this all means is that equipment generally used in cable systems today is incapable of providing an ATSC 3.0 signal in its native format to cable customers. ATSC 3.0 signals cannot be received off-air and demodulated at the cable system headend, cannot be transmitted through the cable system, and cannot be passed through the more than hundred million set-top boxes found in cable customers' homes. And because broadcasters have opted to create this new standard from the ground up, cable system equipment would need to be replaced altogether, rather than just upgraded, to be able to receive, transmit, and support use of this signal for those customers who might be willing to make the investment in new ATSC 3.0-compatible television sets.¹³

¹² Notice ¶ 69 (noting Petitioner's statement that ATSC 3.0 uses a different format for caption data from that used by DTV).

¹³ Moreover, whether or how to convert an ATSC 3.0 signal into an ATSC 1.0 signal able to be sent as a QAM signal on today's cable systems is unknown at this time. The numerous complicated issues arising from making this new type of signal viewable on a cable system – regardless of whether performed by a broadcaster or cable operator – are still being discussed in an ATSC subgroup, TG3/S37. Notice ¶ 29 n.70. These discussions touch on important issues such as: how to convert from files to streams; decisions about whether conversion would best take place at the cable headend or in set-top boxes; how to convert audio from individual components meant to be combined in an ATSC 3.0 TV receiver to two distinct complete audio streams that can be rendered by existing technology; and how to ensure the continued availability of important accessibility features.

Even if broadcast signals could be passed through in a native ATSC 3.0 format, the impact on cable capacity – and on other video and non-video services competing for valuable limited space – would be severe. Because cable customers will continue to have digital television sets that cannot receive ATSC 3.0 signals for the foreseeable future, cable operators will continue to need to provide an ATSC 1.0 stream for their customers and in some cases, multiple versions of that ATSC 1.0 stream (*e.g.*, at different resolutions for different platforms and devices).

Adding the ATSC 3.0 version on top of that would consume significant additional space on limited system capacity. In fact, because of its potentially higher resolution signal, ATSC 3.0 will likely occupy even more capacity on a cable system than ATSC 1.0. Broadcasters today can transmit up to 19.4 mbps in each 6 MHz channel, which cable systems can efficiently carry in an existing 6 MHz QAM channel. ATSC 3.0, however, can use considerably more bits to deliver video programming,¹⁴ which will produce an additional strain on scarce cable capacity.

For all these reasons, it is critical that the introduction of ATSC 3.0 not upset the *status quo*. Over time and on their own timetable, cable systems may calculate that the benefits to their customers outweigh the costs of moving to a system that supports ATSC 3.0. But while broadcasters are experimenting with this new technology, cable systems should not be forced to bear the significant start-up expenses that would prematurely strand equipment and would burden customers with unnecessary costs.¹⁵ Broadcasters stand to gain the lion's share of

¹⁴ See, *e.g.*, <http://ieeexplore.ieee.org/document/7306406/?reload=true> (with HEVC coding, 4K Ultra HD needs a data rate of 23.9 mbps); Dan Rayburn, *The Adoption Of 4K Streaming Will Be Stalled By Bandwidth, Not Hardware & Devices*, Streaming Media Blog (Jan. 14, 2015), <http://blog.streamingmedia.com/2015/01/4k-streaming-bandwidth-problem.html> (“the optimal bandwidth for high quality 4K is higher than 20[]Mbps. UMAX in Korea, for instance, compressed its 4K p60 streams at 32[]Mbps. . .”).

¹⁵ It appears that some broadcasters are eyeing the Incentive Auction Reimbursement Fund as a means to finance their upgrade to ATSC 3.0. See, *e.g.*, ATSC 3.0 Transition and Deployment Guide, Version 1.1 at 5 (attached to

whatever benefits, much of them not broadcast-related, might accrue from launching this incompatible transmission standard; fundamental fairness dictates that they, not cable operators, their customers or over-the-air viewers, bear the costs.

II. THE FCC MUST ENSURE THAT BROADCASTERS CONTINUE TO TRANSMIT A ROBUST ATSC 1.0 SIMULCAST STREAM TO MAINTAIN THE STATUS QUO DURING THE TRANSITION

A. The Commission Should Require Simulcasting of an ATSC 1.0 Stream.

As outlined above, given the potential for cable operators and their customers to bear the brunt of this costly transition, the Commission is right to propose certain protections in its *Notice*. Most fundamental to the public interest is ensuring that those broadcasters opting to launch another digital stream of programming do not degrade their existing over-the-air service while they experiment with a new one. Therefore, we agree with the *Notice*'s proposal "to require Next Gen TV broadcasters to simulcast their ATSC 3.0 stream in ATSC 1.0 format."¹⁶ Broadcasters have conceded that local simulcasting must be "[t]he core of the voluntary, market-driven implementation of ATSC 3.0."¹⁷ The Commission should make sure that the simulcasting obligation actually provides the promised protection for viewers for the entirety of the transition by detailing how simulcasting will work in this context.

Letter from Gerard J. Waldron, Counsel, Pearl TV, to Marlene H. Dortch, Secretary, FCC, GN Dkt. No. 16-142 (Dec. 14, 2016)) ("Eventual installation of ATSC 3.0 equipment could mean changes to tower and tower site infrastructure. If broadcasters incorporate ATSC 3.0 into tower structural engineering studies, tower modifications, and transmitter, RF system and antenna installations during the Spectrum Auction Repack, they will pay only once for potentially expensive and time-consuming work.") For this reason, the Commission should carefully evaluate broadcasters' claims for reimbursement to ensure that "[o]nly the cost of the equipment without optional upgrades is a reimbursable expense." *Notice* ¶ 78. Otherwise, introduction of ATSC 3.0 could unfairly deplete the fund from which cable operators also are entitled to reimbursement.

¹⁶ *Notice* ¶ 11.

¹⁷ Joint Petition for Rulemaking at 17.

First, we agree with the *Notice* that for these purposes, a “simulcast” at a minimum should mean “a stream with identical *content* to the video programming aired on the originating station’s primary ATSC 3.0 stream.”¹⁸ Having identical content would not be enough if, for example, broadcasters were allowed to time-shift programming to alternative, less desirable day-parts. The rules therefore should also specify that the identical content should be provided at the same time on both linear over-the-air streams.¹⁹

Simulcasting identical content at the same time is also necessary to protect against complex issues under the cable copyright compulsory license.²⁰ For example, under Section 111 of the Copyright Act, a “simulcast” is defined as a “multicast stream that *duplicates* the programming transmitted by the primary stream or another multicast stream of such station.”²¹ Unless broadcasters are mandated to provide identical programming on both their ATSC streams, cable operators might be forced to pay additional copyright royalties due to differences in content from the primary stream for continued carriage of certain stations that might be considered out-of-market (“distant” in copyright parlance) in some portions of the cable system.. A simulcasting requirement as outlined above would protect operators against additional liability.

Second, not only the content but the *signal quality and resolution* of the ATSC 1.0 simulcast stream should not be degraded. This is particularly important where a station transmits a high definition signal today – a format that cable customers and over-the-air viewers have

¹⁸ *Notice* ¶ 11 (emphasis added).

¹⁹ The *Notice* also identifies another reason for requiring the same content: carriage of different programming on the ATSC 1.0 simulcast stream could jeopardize compliance with the must-carry rules. As the *Notice* explains, “it is not clear if the MVPD would meet this requirement by carrying different content on the ATSC 1.0 stream from the content broadcast on the ATSC 3.0 signal.” *Notice* ¶ 35 n.90.

²⁰ 17 U.S.C. § 111.

²¹ *Id.* § 111(f)(12) (definition of “simulcast”) (emphasis added).

come to expect from many broadcast stations. That picture quality could easily suffer if broadcasters are allowed to advance their interest in the ATSC 3.0 companion signal at the expense of the ATSC 1.0 signal that is viewed in everyone's home today. Thus, the rules should provide that if a station is transmitting an ATSC 1.0 signal in high definition ("HD") today, it should continue to transmit an ATSC 1.0 simulcast stream in HD of at least the same quality and resolution after the launch of the companion signal even if the station is channel-shared.²² Otherwise, cable customers and over-the-air viewers will be disadvantaged by the broadcaster's choice to experiment with this new transmission standard while delivering an ATSC 1.0 simulcast in lower resolution than consumers receive today – an outcome at odds with the public interest.

Moreover, broadcasters must continue to provide a good quality over-the-air signal to the cable headend from their new location. Not only is this important for must-carry purposes, but in many cases operators rely on over-the-air transmissions for redundant back-up even in cases where they might receive a signal by fiber – or vice versa, depending on the reliability of a fiber feed.²³ The over-the-air signal is an important pathway to ensure the continuous availability of a high-quality signal to the receiving public.

Third, the *Notice* recognizes the importance of the ATSC 3.0 signal continuing to serve its DTV coverage area.²⁴ While that is necessary, it is not enough to protect viewers and cable

²² Where one station currently transmits two of the Big Four networks as streams of the same channel (i.e., one stream as the primary video and a second stream as a multicast), it should be required to deliver ATSC 1.0 simulcast streams of both networks at the same resolution it delivered previously.

²³ For similar reasons, broadcasters that provide a direct fiber feed of their HD signal today should continue to provide an HD fiber feed from the new location, and any such costs must be borne by the broadcaster. And if a station is providing HD content both over-the-air and through a fiber feed today, it should continue to do so over both transmission paths after implementing ATSC 3.0.

²⁴ *Notice* ¶ 12.

operators during this transition period. Broadcasters promise only to serve “a substantially similar community of license” from the host station, a promise plainly insufficient to protect continuity of service to existing cable systems and the viewing public.²⁵ Commission rules should ensure the continuing robustness of a station’s ATSC 1.0 simulcast stream to the area they are licensed to serve.²⁶

Since a single station cannot transmit both an ATSC 1.0 and an ATSC 3.0 signal simultaneously, broadcasters that opt to transmit ATSC 3.0 will either need to: (1) find a “host” station to transmit their ATSC 3.0 signal and use their original station to continue to transmit the ATSC 1.0 signal, or (2) find an alternate “host” for their ATSC 1.0 simulcast stream while converting their original signal to ATSC 3.0. In either case, the Commission must ensure that the ATSC 1.0 station continues to provide service to the original community of license and DTV coverage area and that its ATSC 1.0 simulcast stream does not become degraded. Consumers in the community of license have the right to be served, and for the foreseeable future that service can only be provided by the ATSC 1.0 simulcast.

Moving to a different ATSC 1.0 host transmitter outside the existing community of license and DTV coverage area, while the ATSC 3.0 signal remained in its current location, could force an operator to purchase new equipment, change its receive antenna or make other accommodations, all without the benefit of a reimbursement fund. It would cause consumer disruption and confusion, as they might lose access to the station’s ATSC 1.0 simulcast stream

²⁵ Joint Petition for Rulemaking at 17.

²⁶ Notice ¶ 23.

without upgrading their television sets. The Commission must ensure that its rules protect operators and consumers against being saddled with these costs.²⁷

Ensuring continued transmission to the same community of license is also important for copyright royalty purposes. Royalties could be affected if the ATSC 1.0 simulcast stream is hosted by a station with a different service area than the station's ATSC 3.0 signal or is licensed to a different community. For example, a non-commercial educational station is "local" for copyright purposes if it is within a specified mileage zone of the cable system headend.²⁸ Moving the ATSC 1.0 signal of a public television station to a different transmitter considered "distant" for these purposes could raise complicated questions under the Copyright Act, with the potential to trigger new copyright royalty payments. So, too, would permitting an ATSC 1.0 signal of a commercial television to move to a different DMA.

To avoid these costs and burdens, the over-the-air linear ATSC 1.0 simulcast stream must be required to serve the *same* service area as it serves before the launch of ATSC 3.0, transmitting from a station licensed to the *same* community of license – not the vague "substantially similar" concept advanced by the broadcasters (or the requirement in the draft rule

²⁷ Such an approach would be consistent with the recently-concluded broadcast spectrum incentive auction. Congress there instructed the Commission to make "all reasonable efforts" to preserve "the coverage area and population served of each broadcast licensee. Spectrum Act, § 6403(b)(2). While the Commission permitted stations that relinquished their spectrum in the auction to channel-share with a station outside their community of license in certain circumstances, *see In re Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, ¶ 374 (2014), the flexibility granted in those circumstances was intended to serve a governmental interest not present here – the public interest in facilitating broadcaster participation in the auction. *Id.* ¶ 375. In any event, Congress provided for cable operators to be reimbursed for costs incurred to continue to carry such shared stations – money that would be absent in channel sharing outside the auction context.

²⁸ 17 U.S.C. § 111(f)(4) (definition of "local service area of a primary transmitter").

to arrange for service from another station “substantially covering such station’s community of license”).²⁹

B. Low Power Stations Should Not be Permitted to Flash-Cut to ATSC 3.0.

Cable operators carry low power stations, either pursuant to mandatory carriage in a handful of instances³⁰ or, more commonly, through voluntary carriage arrangements. While the *Notice* suggests that low power stations may face “difficulties . . . in serving as hosts for full power originating stations,”³¹ allowing “LPTV/Class A stations the option to deploy ATSC 3.0 service without simulcasting (*i.e.*, flash-cut to ATSC 3.0)’”³² is not the answer.

As explained above, cable systems and their customers are not equipped to receive an ATSC 3.0 signal, from either low power or full power stations. Therefore, to the extent a low power station is carried today on a cable system, it would be unduly costly and burdensome to carry that station in the future if it no longer provided an ATSC 1.0 version to the cable system headend. For that reason, the Commission should not permit low power stations to flash-cut to ATSC 3.0. If it were to permit such an approach, low power stations should be required at their own expense to convert their ATSC 3.0 signal to an ATSC 1.0 signal so cable operators carrying the signal before the launch of the new format will be able to continue to carry the low power station without incurring additional costs.³³

²⁹ *Notice*, Appendix A at 29 (draft 47 C.F.R. § 73.682(f)(2)).

³⁰ See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 32 FCC Rcd 2637, ¶ 12 n.27 (2017).

³¹ *Notice* ¶ 26.

³² *Id.*

³³ Given that there may be situations where a broadcast station affiliated with a Big Four network relocates to a low power station or channel-shares with a low power station as a result of the incentive auction repacking or for some other reason, the FCC may want to consider requiring such LPTV stations to transmit a 1.0 simulcast during the transition.

C. The Commission Should Incorporate by Reference Both the A/321 and A/322 Physical Layer Standards and Certain Aspects of Video, Audio and Closed Captioning.

The ATSC 3.0 standard is a suite of over a dozen different components. Broadcasters ask the Commission to approve only a single component – “the SDSS portion of the physical layer,” (ATSC A/321). Broadcasters argue that since this one aspect of the physical layer “points to the RF characteristics of the standard, which determines interference and coverage, it is also the only aspect that the Commission need approve in order to assure a stable and predictable RF operating environment.”³⁴ While we do not object to the Commission adopting ATSC A/321, the Commission should strongly consider adopting additional ATSC 3.0 requirements beyond the bare minimum proposed in the broadcasters’ Petition. Doing so would provide additional assurances that ATSC 3.0 receivers can correctly decode the signals transmitted by broadcasters.³⁵

The ATSC A/322 standard defines the signal’s modulation methods and its occupied bandwidth; consequently, this specification determines the amount of co-channel, adjacent channel, and adjacent band interference. To avoid interference, cable operators that receive broadcast signals off-air may find broadcasters’ adherence to this specification to be crucially important, especially if they receive ATSC 1.0 signals that are on channels adjacent to ATSC 3.0 transmissions. Resolving these interference concerns is central to the broadcast spectrum planning that lies at the core of the FCC’s mission and cannot be left open-ended.

Moreover, cable operators that may wish someday to carry ATSC 3.0 in its native format need assurances that the specifications to which they build will enable them to provide the full

³⁴ Joint Petition for Rulemaking at 14-15.

³⁵ Notice ¶ 8.

range of desired features contained in the broadcast signal. Requiring adherence to the A/322 standard on all portions (*i.e.*, all time segments or “data frames”) of broadcasters’ transmitted signal will ensure that development work will be consistent and based on consensus standards. Otherwise, diverging and potentially proprietary methods of delivery could needlessly complicate the transition to ATSC 3.0.

In addition to mandating that broadcasters adhere to ATSC 3.0’s core physical layer standards, A/321 and A/322, the Commission should also heed ATSC’s recommendation and require that broadcasters select a single HDR video system. Although the ATSC 3.0 standard supports the use of either PQ or HLG technologies to achieve HDR,³⁶ ATSC recommends that all broadcasters within a given region adhere to a single HDR standard.³⁷ The FCC should require such adherence to avoid compatibility issues similar to those described above, as HDR incompatibilities could adversely impact consumers’ access to broadcast television, whether accessed over-the-air or through an MVPD.

There are a range of other issues on which adequate coordination and standardization will be key to providing important services to viewers. For example, cable operators and broadcasters currently rely on ATSC A/85 standards to mitigate loud commercials pursuant to the CALM Act. However, broadcasters have selected the new AC-4 audio system for use with ATSC 3.0 transmissions in North America. Will ATSC 3.0 broadcasters be able to comply with the CALM Act provisions? What about closed captioning and video description? Will ATSC 3.0 include signaling to allow viewers to select from a program’s multiple audio tracks?

³⁶ Advanced Television Systems Committee, *ATSC Proposed Standard: Video – HEVC (A/341)*, at 11 (Mar. 2, 2017).

³⁷ Advanced Television Systems Committee, *ATSC Candidate Standard: ATSC 3.0 System (A/300)*, at 14 (Apr. 12, 2017).

Standards to ensure consistent video, audio, and accessibility features among all broadcast signals are essential to promote universal service, public safety, and accessibility goals, as well as to ensure that cable operators are not unduly burdened in the retransmission of 3.0 broadcast signals.

More generally, if *any* of the layers in the broadcast signal do not conform to the documented standards, then the receiving equipment cannot be assumed to be able to decode the signal properly. Accordingly, the FCC should remain open to incorporating additional components of the ATSC 3.0 standard into its rules as the transition progresses.

D. Stations Should Provide Sufficient Notice to Cable Operators Prior to Launching an ATSC 3.0 Signal and its ATSC 1.0 Simulcast Stream.

Sufficient notice from a broadcaster to a cable operator will be important to ensure that service is not disrupted. Notice should not only be provided by stations carried pursuant to must-carry³⁸ but also by any station carried by the cable system that is moving its ATSC 1.0 simulcast stream to a new channel.

Such notices should contain all the critical information relating to channel changes and technical specifications required of stations that engage in auction-related channel sharing.³⁹ Further, a broadcaster should provide the operator sufficient time to ensure a smooth transition. The 60-day timeframe proposed in the *Notice* would be too short for these purposes.⁴⁰ Instead,

³⁸ See *Notice* ¶ 37.

³⁹ *Id.*

⁴⁰ Notably, the Commission provided at least *90 days*’ notice to MVPDs in the context of expanded channel sharing, which will likely be far less complicated than implementation of an entirely new broadcast standard in this proceeding. See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Report and Order*, 32 FCC Rcd 2637, ¶ 51 (2017) (“*Channel Sharing Order*”) (requiring that sharee stations provide notice to MVPDs “at least 90 days prior to terminating operations on the sharee’s channel” and that “both sharer and sharee stations provide notice at least 90 days prior to initiation of operations on the sharer channel”).

broadcasters should provide at least 6 months' notice to ensure an orderly switch-over to carriage of an ATSC 1.0 simulcast stream from a different station location.

III. THE COMMISSION SHOULD ENSURE THAT CABLE OPERATORS AND CONSUMERS ARE NOT HARMED BY THE LAUNCH OF THE ATSC 3.0 SIGNAL

As the *Notice* notes, even the broadcasters agree that if they are permitted to experiment with the transmission of an ATSC 3.0 signal, MVPDs' mandatory carriage obligations should be limited to the 1.0 simulcast, and *not* the voluntary 3.0 signal, of a local broadcast station.⁴¹ As a matter of policy – and Constitutional law – it could not be otherwise. Requiring carriage of the 3.0 signal at a time when cable households are not equipped to receive and cable systems are not equipped to carry such a signal would be enormously costly and disruptive at best, forcing operators to incur substantial costs while causing customers to lose access to broadcast signals unless they purchased expensive new receivers or adapters. Moreover, mandatory carriage of the ATSC 3.0 signal, while imposing such burdens on the protected speech of cable operators, would not significantly promote any important government interest.

Indeed, if cable operators were required to carry the 3.0 signal in lieu of the 1.0 signal, that would *undermine* the ostensible purpose of the mandatory carriage provisions of the Communications Act, which was to ensure that over-the-air broadcast stations retained sufficient potential viewership on cable to remain viable and available to the diminishing number of over-the-air viewers. Carrying only ATSC 3.0 signals to 3.0-equipped receivers would surely diminish broadcast viewership on cable systems. On the other hand, requiring carriage of the 3.0 signal *in addition to* the 1.0 signal would result in virtually no incremental viewership of broadcast programming while seriously compounding the burden on cable operators' available

⁴¹ *Notice* ¶ 31.

bandwidth. It is hard to imagine how such a dual carriage requirement would serve any legitimate policy interest, much less survive First Amendment scrutiny under the standard set forth in *Turner Broadcasting*.⁴²

The *Notice*, therefore, asks how best to authorize the broadcaster's proposed channel sharing approach in a manner that avoids the public policy and constitutional problems that would arise if the must-carry provisions of the statute required carriage of ATSC 3.0 signals in addition to or in lieu of ATSC 1.0 signals.⁴³ The question arises because broadcasters expect to offer their 1.0 and 3.0 transmissions on two separate channels. One would be transmitted on the broadcaster's own licensed channel, while the other would share spectrum on a channel licensed to another broadcaster.

Section 614(a) requires cable operators to carry the signals of "local commercial television stations,"⁴⁴ which are defined by Section 614(h)(1)(A) to mean "any full power television broadcast station . . . licensed and operating on a channel regularly assigned to its community by the Commission that, with respect to a particular cable system, is within the same market as the cable system."⁴⁵ And Section 614(b)(3) provides that "[a] cable operator shall carry in its entirety, on the cable system of that operator, the *primary video*, accompanying

⁴² *Turner Broad. Sys. v. FCC*, 512 U.S. 622, 661-62 (1994); see *Carriage of Digital Television Broadcast Signals*, Second Report and Order and First Order on Reconsideration, 20 FCC Rcd 4516, ¶¶ 25, 27 (2005) (analyzing government interests identified in *Turner* to conclude that "there has not been an adequate showing that dual carriage is necessary to achieve any valid governmental interest" and declining to "impose dual carriage requirements that burden speech in the absence of record evidence showing dual carriage is necessary for a timely completion of the [DTV] transition").

⁴³ *Notice* ¶ 31.

⁴⁴ 47 U.S.C. § 534(a) (emphasis added).

⁴⁵ *Id.* § 534(h)(1)(A) (emphasis added).

audio, and line 21 closed caption transmission of each of the local commercial television *stations* carried on the cable system.”⁴⁶

What this means is that if a television station is licensed to and operates on a channel within a cable operator’s market, the cable operator must carry the “primary video” of that station. If that television station provides two streams of video, cable operators in the market in which the station is assigned must only carry the stream that is deemed to be the “primary video.” Thus, during the transition from analog to digital broadcasting, the standard definition analog stream was deemed the “primary video,” and there was no requirement to carry the digital stream until the transition was completed. Unlike the digital transition, which was mandated by statute and subsidized by the federal government, it is not even clear whether there will ever be a “transition” to ATSC 3.0, which is not mandated at all. But if the Commission chooses to allow broadcasters to experiment with ATSC 3.0 while continuing to provide ATSC 1.0 simulcast streams, it should rule that, at this time, it is the 1.0 simulcast stream that will be deemed the *station’s* “primary video” – whether that stream is transmitted on the channel licensed to the broadcaster or on a channel shared with another broadcaster. Then, if the station opts for must-carry, it will be that single 1.0 simulcast stream that must be carried by cable systems in that station’s market – which is precisely the outcome that all agree upon.⁴⁷

The Commission should also be alert to the risk that ATSC 1.0 could be used to secure new carriage rights for ATSC 3.0 that could harm consumers and create undue hardship for cable

⁴⁶ *Id.* § 534(b)(3) (emphasis added).

⁴⁷ As in the recent *Channel Sharing Order*, the FCC should also make clear that a broadcast station cannot use local simulcasting as a shortcut to gain or expand carriage rights simply by moving its 1.0 simulcast stream to a new host location. See *Channel Sharing Order* ¶ 24 (“[A]lthough we allow all secondary stations to become sharee stations outside the auction context, we do not permit secondary stations to enter into channel sharing arrangements solely as a means to newly obtain must-carry rights.”). Thus, an ATSC 1.0 simulcast at a host station should be entitled to must-carry only if it (1) qualified for, and has been exercising, must-carry rights in its original location and (2) continues to meet must-carry criteria in the new location.

operators. To be clear, NCTA is not seeking to alter the current retransmission consent model where broadcasters and operators negotiate for carriage. Carrying ATSC 3.0, however, is not analogous to carrying additional programming. ATSC 3.0 represents a major and very complex change in technical standards that would require massive and very expensive trade-outs of equipment, and would likely put pressure on consumer rates. Moreover, carriage of the ATSC 3.0 signal would duplicate programming already carried on the ATSC 1.0 simulcast, resulting in relatively few accompanying benefits – at least for some time.

There is a risk, too, of additional blackouts if broadcasters refuse to allow carriage of ATSC 1.0 unless a cable company also carries ATSC 3.0. Early in this transition, given the massive expense and lack of benefits, cable operators may be initially unwilling to carry ATSC 3.0, and efforts to gain carriage by withholding the ATSC 1.0 signal may result in blackouts, or force operators to spend heavily on unproved services that may never fully take hold in the market.

Given the unique nature of this technical transition, including the fact that it is far from clear that ATSC 3.0 will take hold in the market, the expense to operators of carrying ATSC 3.0 signals, and the potential harm to consumers, the FCC should consider taking steps under its authority to avoid this risk. Possible approaches might include license conditions, good faith requirements, or other steps.

IV. THE FUTURE PROCEEDING TO CONSIDER A SUNSET DATE FOR SIMULCASTING SHOULD ADDRESS ADDITIONAL IMPLEMENTATION DETAILS

The *Notice* proposes that “the Commission decide in a future proceeding when it would be appropriate for broadcasters to stop simulcasting in ATSC 1.0” and notes that “all parties to

this proceeding appear to agree that this issue should be handled in a separate proceeding.”⁴⁸ We agree that the Commission should carefully consider additional details of ATSC 3.0 implementation and evaluate their impact on cable operators and their customers before even contemplating sunsetting the simulcast requirement. Stations have no obligation to ever use this standard and there is no reason at this stage to assume that cable systems will want to make this transition themselves. Therefore, determining whether a particular market – or the nation as a whole – has sufficiently robust penetration of ATSC 3.0-ready television sets, or whether cable systems have deployed equipment so that this transition will not impose unnecessary costs, will be no easy task.

There are a host of other issues that will need to be addressed in a future proceeding. ATSC 3.0 has been described as nothing short of “revolutionary.”⁴⁹ As described above, the novel technical characteristics of the broadcast signal embodied in this new standard raise many issues regarding retransmission of this new type of signal on a cable system.

The Commission, for example, will need to consider what constitutes a “good quality” ATSC 3.0 signal at the cable headend. An ATSC 3.0 signal can consist of several “physical layer pipes” that can be constructed with differing levels of robustness, only some of which might be receivable at a system’s headend. What are the must-carry implications for carriage of such a variable signal?⁵⁰ The Commission will also be required to confront the question of what constitutes “program-related” material that operators would need to carry if technically feasible,

⁴⁸ Notice ¶ 27.

⁴⁹ Rich Chernock, *Getting From Here to ATSC 3.0: Next-Gen Standard “Changes Everything”*, TV Technology (Feb. 8, 2017) <http://www.tvtechnology.com/atsc3/0031/getting-from-here-to-atsc-30/280299>.

⁵⁰ The Commission also should evaluate how the strains on cable capacity caused by ATSC 3.0 must-carry stations impact the constitutionality of these rules.

along with the “primary video” stream of the ATSC 3.0 signal.⁵¹ It would likewise need to define what constitutes “material degradation”⁵² of an ATSC 3.0 signal.

In addition to these carriage questions, the Commission will need to address issues occasioned by another round of station changes, as broadcasters that had moved their ATSC 3.0 signal to a different host station will need to move back to their original channel once their ATSC 1.0 signal is turned off. This arrangement has the potential to introduce more costs and dislocations as operators and over-the-air viewers will be faced with yet more channel changes. The Commission must carefully consider this impact prior to permitting any sunset of the ATSC 1.0 signal.

Moreover, prior to ending the transition and mandating carriage of any station transmitting in this new standard, the Commission must come to grips with any patent issues. Even if stations are voluntarily transitioning, the Commission must ensure that any intellectual property embedded in this new standard is made available to all concerned on reasonable and non-discriminatory terms.⁵³

⁵¹ 47 U.S.C. § 534(b)(3) (requiring cable operator to carry “in its entirety . . . the primary video, accompanying audio, and line 21 closed caption transmission of each of the local commercial television stations carried on the cable system and, to the extent technically feasible, *program-related material carried in the vertical blanking interval or on subcarriers*”) (emphasis added).

⁵² *Id.* § 534(b)(4)(A) (“The signals of local commercial television stations that a cable operator carries shall be carried without material degradation. The Commission shall adopt carriage standards to ensure that, to the extent technically feasible, the quality of signal processing and carriage provided by a cable system for the carriage of local commercial television stations will be no less than that provided by the system for carriage of any other type of signal.”).

⁵³ See, e.g., *In re Advanced Television Systems and Their Impact Upon Existing Television Broadcast Service*, Fourth Report and Order, 11 FCC Rcd 17771, ¶ 17794 (1996) (recognizing that “in order for DTV to be successfully implemented, the patents on the technology would have to be licensed to other manufacturing companies on reasonable and nondiscriminatory terms” and premising adoption of the standard on “reasonable and nondiscriminatory licensing of relevant patents,” with the commitment to take appropriate action if patent licensing became a problem in the future).

These are but a few of the complex issues that the Commission would need to resolve before ever contemplating permitting stations to abandon their ATSC 1.0 viewers in favor of ATSC 3.0.

CONCLUSION

For the foregoing reasons, the Commission should protect against broadcasters shifting the costs and burdens of their voluntary transition to cable operators and their customers.

Respectfully submitted,

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